Grid Operations and Management

Contract #: 100-98-001 **Project #:** 12
Contractor: Electric Power Research Institute (EPRI)
Subcontractors: EPRI Conference Blan : ABB Systems Control : Bailey Network Management : Bonneville Power Administration : Cegelec ESCA Corporation : Decision Systems International : Duquesne Light Company : General Physics Corporation : General Reliability : Houston Lighting & Power Company : Incremental Systems, Inc. : Iowa State University : Kansas City Power & Light Company : KEMA Consulting, KEMA-ECC, Inc. : Oracle Corporation : Pattern Recognition Technologies : Potomac Electric Power Company : Quality Training Systems : Siemens Energy and Automation, Inc. : Siemens/Empros : TU Electric Company : University of Liege : Utility Consulting International : V&R Company : Energy Systems Research : Warsaw University of Technology : Washington State University
Project Amount: $370,000
Match Amount: $9,691,100
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Status: Completed

Project Description:
The purpose of this project is to support EPRI's collaborative program in Grid Operations and Management, which is developing new tools and information to ensure that the power grid will be a gateway to efficient competition and the key to customer satisfaction. EPRI provides tools and information that offer guidance on how to respond to demands to safely push more power through the system without jeopardizing system security. EPRI's products give system operators a clear view of real-time grid conditions, and allow them to make decisions that take into account maximum use of the grid as well as reliability of the system. Examples include vital resources to support operator training, real-time software for Energy Management System (EMS) control and operation, and seamless communication between Energy Management Systems and power plants.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California's electricity through innovative technologies, which help to balance the competing needs of maximizing the use of the grid while maintaining the security of the system.
- Improving the energy cost/value of California's electricity by merging new tools for grid functionality with information for operating in the new competitive marketplace. EPRI technology development programs will help to increase transmission capacity across constrained interfaces, thus reducing grid-operating costs, while enhancing system security.

Proposed Outcomes:

1. Provide software, methods, and information to enhance the transaction management capabilities of transmission system operations, and to allow increased transactions without impact on security.
2. Provide software, methods, and information to maximize energy transfers and increase energy flows across constrained interfaces.
3. Provide software, methods, and information to increase the transmission system capacity.

4. Conduct a Tailored Collaboration entitled “EPRI Early Warning System Project” to identify and report Y2K anomalies and events in electric and natural gas operations from 12/31/99 through 1/4/00.

Actual Outcomes:

1. Transaction management.
   - Version 1.4 of the transaction management software Open Access Same-time Information System (OASIS) software was developed. A response was prepared to FERC Order 638 to enhance the functionality and performance of OASIS business practices.
   - A variety of open-system, standardized tools were provided that will permit the CA-ISO to implement advanced security applications without regard for existing proprietary databases. Tools include Version 1.0 of the Application Program Interface (API), which enables users to integrate applications from various sources, and a Topology Processor, which allows applications developed for planning environments to be integrated into operating environments.
   - Two reports were published on the Common Information Model (CIM), which provides a common language for information.
   - New graphical user interfaces were developed for existing grid operations applications to ensure they have a consistent look-and-feel.
   - EPRI’s Operator Training Simulator was integrated with API and CIM to allow operators to be trained with CIM data.
   - Five restoration lessons were produced for the Emergency System Management and Restoration (ESMR) product.
   - A tri-annual newsletter was published on new software programs and methods for improved transmission grid operation.
   - A report was published summarizing gird operations and planning issues, needs, technological advances, and regulatory changes in the 2000-2005 time frame.
2. Increase power flows.
   - Version 2.0 was released of EPRI’s Transfer Capability Evaluation (TRACE) software, which allows system operators to determine the maximum number of simultaneous power transfers possible.
   - TRACE was integrated with IEEE PSADD Common format to support the latest version of Power Technologies’ PSS/E data formats.
   - A TRACE training workshop was held.
3. Increase transmission capacity.
   - EPRI’s Dynamic Security Assessment (DSA) software was made available. DSA allows operators to increase loading on constrained networks by calculating stability limits on-line in real time.
   - Two reports were published on DSA and Risk-Based Security Assessment.
   - Version 1.1 was released of EPRI’s On-line Voltage Security Assessment (VSA) software, which allows system operators to increase power transfers across voltage-constrained networks by calculating voltage limits on-line in real-time.
4. A web site was established and operated to communicate information about the actual operating experience of selected locations during the year 2000 rollover.

Project Status:

The project has been completed.